The Patent Office alleges that JP '456 teaches a method comprising calcining a powder mixture of Al_2O_3 and Y_2O_3, pulverizing the calcined mixture, molding the pulverized mixed powder and heating the molded product in a nitrogen atmosphere to form a yttrium-aluminum garnet sintered body. The Patent Office acknowledged that JP '456 does not teach or suggest introducing aluminum nitride to the yttrium-aluminum garnet. The Patent Office introduced Rosenflanz as allegedly teaching abrasive particles where a source of nitrogen, such as aluminum nitride, can be used with an Al_2O_3 source and a Y_2O_3 source to form the abrasive particles. The Patent Office thus alleges that it would have been obvious to one of ordinary skill in the art to have substituted the nitrogen atmosphere in JP '456 with aluminum nitride for making the sintered body as taught by JP '456. Applicant strenuously disagrees with the Patent Office's allegations.

A. Claim 1

Applicant submits that neither JP '456 nor Rosenflanz teaches or suggests the method of producing a sintered body of yttrium-aluminum garnet as recited in claim 1. Specifically, neither JP '456 nor Rosenflanz teaches or suggests a method comprising the step of sintering a mixture comprising a source compound for yttrium, a source compound for aluminum, and aluminum nitride to produce a sintered body of yttrium-aluminum garnet as recited in claim 1.

Instead, JP '456 teaches that Al_2O_3 powder and Y_2O_3 powder are blended and then calcined. Aluminum nitride is not present at all in the teachings of JP '456. Thus, JP '456 merely teaches that an aluminum source and a yttrium source are alone blended. This clearly differs from a mixture comprising a source compound for yttrium, a source compound for aluminum, and aluminum nitride as required in claim 1.

Rosenflanz does not remedy the deficiencies of JP '456. In particular Rosenflanz does not teach or suggest sintering a mixture of a source compound for yttrium, a source

compound for aluminum, and aluminum nitride as recited in claim 1. Rosenflanz instead teaches fusing Al_2O_3, Y_2O_3, metal nitride, metal oxynitride metal carbide, oxycarbide, and the like. See column 4, lines 62-65 of Rosenflanz. Moreover, as explained in detail below, one of ordinary skill in the art would not have combined the teachings of JP '456 and Rosenflanz.

Applicant thus submits that JP '456 and/or Rosenflanz do not teach or suggest the method recited in claims 1 and 2.

B. Claim 15

The Patent Office alleges that JP '456 teaches the method recited in claim 15, except introducing aluminum nitride to the yttrium-aluminum garnet as recited in claim 15. The Patent Office introduced Rosenflanz as allegedly teaching this feature. The Patent Office alleges that Rosenflanz teaches that aluminum nitride is known as a nitrogen source and that it would have been obvious to one of ordinary skill in the art to substitute the nitrogen atmosphere taught in JP '456 with aluminum nitride for making the sintered body taught by JP '456.

Rosenflanz teaches a very different procedure than the method recited in claim 15. Particularly, Rosenflanz teaches melting at least one Al_2O_3 source and at least one Y_2O_3 source to provide a melt, wherein at least one source of nitrogen (e.g., AlN) or carbon (e.g., Al_4C_3) is provided in the melt, and then fusing the melt to form fused abrasive particles. See column 3, line 66 to column 4, line 2 of Rosenflanz.

Applicant submits that one of ordinary skill in the art would not have combined the teachings of Rosenflanz and JP '456 to obtain the method recited in claim 15. Specifically, JP '456 seeks to produce a yttrium-aluminum garnet sintered body, whereas Rosenflanz seeks to produce fused abrasive particles.

Furthermore, the methods taught by JP '456 and Rosenflanz are completely different. As discussed above, JP '456 teaches a method comprising calcining a powder mixture of

Al_2O_3 and Y_2O_3, pulverizing the calcined mixture, molding the pulverized mixed powder and heating the molded product in a nitrogen atmosphere to form a yttrium-aluminum garnet sintered body. Rosenflanz teaches melting at least one Al_2O_3 source and at least one Y_2O_3 source to provide a melt, wherein at least one source of nitrogen (e.g., AlN) or carbon (e.g., Al_4C_3) is provided in the melt, and then fusing the melt to form fused abrasive particles. See, for example, column 3, line 66-column 4, line 4 of Rosenflanz.

According to the teachings of Rosenflanz, it is not possible to control the uniformity of the grain size in the melting method. This results in a fused body having a diverse distribution of grain size and a low light transmittance. In other words, the abrasive particles would not be transparent or semi-transparent. Applicant submits that one of ordinary skill in the art would not have combined the method of making a light transmissive yttrium-aluminum garnet sintered body of JP '456 with the method of making a non-transmissive fused abrasive particles taught by Rosenflanz.

As such, Applicant submits that one of ordinary skill in the art seeking to produce a yttrium-aluminum garnet sintered body would not have looked to the fused abrasive particles taught by Rosenflanz.

Moreover, JP '456 requires a nitrogen atmosphere as a reducing, non-oxidizing atmosphere. The nitrogen atmosphere is <u>not</u> provided as a source of nitrogen into the sintered body. The purpose of the nitrogen atmosphere in JP '456 is to provide a conventional reducing atmosphere for firing.

JP '456 teaches that the yttrium-aluminum garnet sintered body is obtained from Al_2O_3 and Y_2O_3. See the Abstract of JP '456. There is no need to introduce a nitrogen source as a reactor in the reaction system. The yttrium-aluminum garnet sintered body taught by JP '456 is composed of yttrium, aluminum and oxygen atoms, and does not contain nitrogen atoms.

The molded body of JP '456 is fired in a nitrogen atmosphere or a vacuum atmosphere of 1×10^{-2} degree of the vacuum. See the Abstract of JP '456. The sintering is carried out in a reducing atmosphere because hydrogen or nitrogen diffuse compared with air so that the densification of the sintered body can be easily attained. See the attached English-language translation of paragraph 11 of JP '456. Sintering in a vacuum is also preferred for similar reasons. The sintering is carried out in a vacuum atmosphere of 1×10^{-2} torr or lower to obtain the yttrium-aluminum sintered body. See the attached English-language translation of paragraph 14 of JP '456. JP '456 merely requires that the sintering of the ytrrium-aluminum garnet be carried out in a reducing atmosphere or vacuum to avoid the reaction of the yttrium-aluminum garnet with oxygen.

Applicant thus submits that the Patent Office's position that the nitrogen atmosphere for sintering taught by JP '456 is a nitrogen source is clearly erroneous. Further, one of ordinary skill in the art would not have replaced the gas atmosphere of JP '456 with the aluminum nitride compound of Rosenflanz. The aluminum nitride compound taught by Rosenflanz is not a reducing atmosphere, but is instead a material capable of being a reactant. Applicant thus submits that the nitrogen atmosphere in JP '456 is used differently than the aluminum nitride in Rosenflanz, and the components are not equivalent.

Even if JP '456 and Rosenflanz were to have been combined, the method recited in claim 15 would not have been achieved. Rosenflanz teaches melting all components together and then fusing. According to the teachings of Rosenflanz, nothing would have led one of ordinary skill in the art to include aluminum nitride only after first calcining the yttrium and aluminum to produce yttrium-aluminum garnet. Thus, neither JP '456 nor Rosenflanz teaches or suggests the process steps recited in claim 15.

Applicant thus submits JP '456 and/or Rosenflanz do not teach or suggest the method recited in claims 15 and 16.

C. Conclusion

For the foregoing reasons, Applicant submits that JP '456 and Rosenflanz, in combination or alone, do not teach or suggest the method recited in claims 1, 2, 15 and 16. Reconsideration and withdrawal of the rejection are thus respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-10 and 15-24 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:LL/tlp

Attachment:
English-language translation of
paragraphs 11 and 14 of JP 06-107456

Date: December 12, 2005

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DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

I, Norikazu NIIMI, being familiar with the Japanese and English languages, and hereby declare that I am the translator of the documents attached and certify that to the best of my knowledge and belief the following is a true and accurate translation of (0011) and (0014).

Signed N. Niimi

Date November 7th 2005

(0011)

Further, the sintering is carried out in a reducing atmosphere, because H2 or N2 can easily diffuse compared with air so that the densification of the sintered body can be easily attained. The sintering in vacuum is also preferred due to the similar reason.

(0014)

Then, the sintering is carried out in vacuum atmosphere of 1×10^{-2} torr or lower at 1600 to 1900 °C for 2 to 10 hours. The vacuum degree may preferably be 10^{-3} torr or higher. The rate of raising temperature may preferably be 50 to 300 °C per one hour and most preferably be 200 to 300 °C per one hour under a predetermined temperature such as 1650 °C. Then, the temperature is held for 2 to 30 hours for making the grain diameter uniform. Then, the temperature is raised by 100 °C per one hour, preferably by 20 °C per one hour, until the maximum temperature and the maximum temperature is maintained for 2 to 20 hours. A YAG sintered body is thus obtained.